CLAIMS

1. A method for seismic data transmission comprising the steps of:

A. Providing an array of at least two seismic acquisition units, wherein a first seismic acquisition unit is capable of receiving a short range radio transmission and transmitting a short range radio transmission and a second seismic acquisition unit that is capable of acquiring seismic data;

B. Utilizing the second seismic acquisition unit to transmit seismic data via short range radio transmission to the first seismic acquisition unit; and

C. Utilizing the first seismic acquisition unit to receive seismic data via short range radio transmission from the second seismic acquisition unit.

2. The method of claim 1 further comprising the step of utilizing the first seismic acquisition unit to transmit the received seismic data via short range radio transmission.

3. The method of claim 2, further comprising the step of providing a receiving station for receiving the short range radio transmission from the first seismic acquisition unit.

4. The method of claim 3, further comprising the step of utilizing the short range radio transmission to transmit seismic data from said array to said receiving station.

5. The method of claim 4, further comprising the step of recording seismic data from said array at said receiving station.

6. The method of claim 4, wherein multiple short range radio transmissions are utilized to transmit multiple sets of seismic data from said array to said receiving station.

7. The method of claim 6, further comprising the step of recording multiple sets of seismic data from said array at said receiving station.

8. The method of claim 3, further comprising the step of providing a control station for receiving the short range radio transmission from the first seismic acquisition unit, wherein the control station is remote from said receiving station.

9. The method of claim 8, further comprising the step of transmitting seismic data from said receiving station to said control station.

10. The method of claim 9, wherein the transmission of seismic data from said receiving station to said control station is accomplished utilizing long range radio transmission.

11. The method of claim 9, wherein the transmission of seismic data from said receiving station to said control station is accomplished utilizing fiber optic cable.

12. The method of claim 9, wherein the transmission of seismic data from said receiving station to said control station is accomplished utilizing data telemetry cable.

13. The method of claim 1 further comprising the step of acquiring seismic data utilizing said first and second seismic units.

14. The method of claim 13 further comprising the steps of utilizing the first seismic acquisition unit to transmit via short range radio transmission seismic data acquired by said second seismic unit.

15. The method of claim 14 further comprising the steps of utilizing the first seismic acquisition unit to transmit via short range radio transmission seismic data acquired by said first seismic unit.

16. A method for seismic data transmission comprising the steps of:

A. Providing a plurality of seismic acquisition units, wherein each of said seismic acquisition units is capable of acquiring seismic data, receiving a short range radio transmission and transmitting a short range radio transmission;

B. Utilizing a plurality of said seismic acquisition units to transmit seismic data via short range radio transmission to another seismic acquisition unit in the array; and

C. Utilizing a plurality of said seismic acquisition units to receive seismic data via short range radio transmission from another seismic acquisition unit in the array.

17. The method of claim 16, further comprising the steps of partitioning said plurality of seismic acquisition units into at least two sub-sets of seismic acquisition units and using a short range radio transmission technique having parameters set so that non-interfering radio transmission may be effected in each sub-set.

18. The method of claim 17, further comprising the steps of partitioning said plurality of seismic acquisition units into a third sub-set, wherein the first and third sub-set of seismic acquisition units are spaced apart from one another by said second sub-set of seismic acquisition units.

19. The method of claim 18, further comprising the step of assigning transmission parameters so the third sub-set of seismic acquisition units have the same short range radio transmission parameters as that assigned to the first sub-set.

20. The method of claim 17, further comprising the step of utilizing a plurality of said seismic acquisition units within said first subset to transmit seismic data via short range radio transmission to other seismic acquisition units in the first subset while simultaneously utilizing a plurality of said seismic acquisition units within said second subset to transmit seismic data via short range radio transmission to other seismic acquisition units in the second subset, wherein each transmission is made utilizing the short range radio transmission parameters assigned to the respective subset.

21. The method of claim 17, further comprising the step of utilizing a plurality of said seismic acquisition units within said first subset to transmit seismic data via short range radio transmission to other seismic acquisition units in the first subset while simultaneously utilizing a plurality of said seismic acquisition units within said second subset to transmit seismic data via short range radio transmission to other seismic acquisition units in the second subset while simultaneously utilizing a plurality of said seismic acquisition units within said third subset to transmit seismic data via short range radio transmission to other seismic acquisition units in the third subset, wherein each transmission is made utilizing the short range radio transmission parameters assigned to the respective subset.

22. The method of 19, wherein each seismic acquisition unit has a radio transmission range and the seismic acquisition units within the first and third subsets are sufficiently spaced apart so as to fall outside the transmission range of any seismic acquisition unit within the respective subsets.

23. The method of 19, wherein each seismic acquisition unit has a radio transmission range that can be adjusted by adjusting the transmission parameters so that the first and third sub-sets have transmission ranges that do not interfere with one another.

24. The method of claim 16, wherein each acquisition unit has a set of transmission parameters associated therewith and an adjustable transmission range, the method further comprising the step of adjusting the transmission range by adjusting the transmission parameters.

25. The method of claim 24, wherein the transmission range is adjusted by adjusting the transmission power.

26. The method of claim 1, wherein at least one seismic acquisition unit is capable of receiving short range radio transmissions from at least two other seismic acquisition units.

27. The method of claim 26, wherein each seismic acquisition unit is capable of receiving short range radio transmissions from at least two other seismic acquisition units.

28. The method of claim 26, wherein each seismic acquisition unit is capable of receiving short range radio transmissions from at least three other seismic acquisition units.

29. A method for seismic data transmission comprising the steps of:

A. Providing at least three spaced apart seismic acquisition units deployed in an array, wherein each of said seismic acquisition units is capable of receiving a short range radio transmission and transmitting a short range radio transmission;

B. Providing a receiving station for receiving a short range radio transmission from at least one seismic acquisition unit within said array;

C. Identifying at least one signal transmission path through the array from a seismic acquisition unit to the receiving station, wherein a transmission path is defined as a chain of at least two seismic acquisition units and the receiving station, each capable of communicating in series via short range radio transmission; and

D. Transmitting a signal along said identified transmission path.

30. The method of Claim 29 further comprising the step of identifying at least two separate transmission paths from a seismic acquisition unit to the receiving station.

31. The method of Claim 30 further comprising the step of transmitting a first signal along one transmission path and transmitting a second signal along the other transmission path.

32. The method of Claim 29, wherein each of said seismic acquisition units is capable of acquiring seismic data.

33. The method of Claim 32, further comprising the step of acquiring seismic data utilizing said seismic acquisition units.

34. The method of Claim 33, wherein the transmitted signal received by the receiving station includes seismic data acquired by at least one of said seismic acquisition units.

35. The method of Claim 34, wherein the transmitted signal received by the receiving station includes seismic data acquired by a plurality of said seismic acquisition units.

36. The method of Claim 16, wherein each seismic acquisition unit has a radio transmission range.

37. The method of Claim 36, wherein at least two seismic acquisition units fall within the radio transmission range of another seismic acquisition unit.

38. The method of Claim 36, wherein the radio transmission range of each seismic acquisition unit is omnidirectional.

39. The method of Claim 36, wherein the radio transmission range of at least one of the seismic acquisition units is omnidirectional.

40. The method of Claim 36, wherein the radio transmission range of at least one of the seismic acquisition units is unidirectional.

41. The method of claim 29, wherein the transmission chain is comprised of a plurality of seismic acquisition units.

42. The method of claim 41, wherein said transmission chain includes each seismic acquisition unit in the array.

43. A method for seismic data transmission comprising the steps of:

A. Generating a radio signal from a first seismic acquisition unit; and

B. Transmitting the radio signal to a receiving station,

C. Wherein the step of transmitting is accomplished by relaying the transmitted signal through a second seismic acquisition unit.

44. The method of claim 43, wherein the step of transmitting is accomplished by relaying the transmitted signal through a plurality of seismic acquisition units.

45. The method of claim 36, further comprising the step of adjusting the transmission range of a seismic acquisition unit so as to alter the number of other seismic acquisition units within radio transmission range of the adjusted seismic acquisition unit.

46. The method of claim 4, further comprising the step of accumulating and storing seismic data transmitted from the array at the receiving station.

47. The method of claim 29, wherein said receiving station is within short range radio range of at least two seismic acquisition units.

48. The method of claim 29, wherein said receiving station is within short range radio range of at least three seismic acquisition units.

49. The method of claim 29, wherein said receiving station transmits control signals to said seismic acquisition units.

50. The method of claim 35, wherein said receiving station transmits control signals to said seismic acquisition units and said control signal is transmitted over the same transmission chain utilized to transmit seismic data from seismic acquisition units to the receiving station.

51. The method of claim 35, wherein said receiving station transmits control signals to said seismic acquisition units and said control signal is transmitted over a different transmission chain than that utilized to transmit seismic data from seismic acquisition units to the receiving station.

52. The method of claim 29, further comprising at least two transmissions from said seismic acquisition units to the receiving station.

53. The method of claim 52, wherein the transmissions from said seismic acquisition units to the receiving station are made utilizing different transmission chains.

54. The method of claim 29, further comprising the step of utilizing a long range transmission to transmit control signals from said receiving station to said seismic acquisition units.

55. The method of claim 8, further comprising the step of utilizing a long range transmission to transmit control signals from said control station to said seismic acquisition units.

56. The method of claim 1, wherein a transmission from a seismic acquisition unit includes information identifying the position of the seismic acquisition unit.

57. The method of claim 1, wherein a transmission from a seismic acquisition unit includes information identifying the identity of the seismic acquisition unit.

58. The method of claim 29, wherein said transmission path is preset among the seismic acquisition units.

59. The method of claim 58, wherein a second alternate transmission path is preset among the seismic acquisition units.

60. The method of claim 29, wherein multiple transmission paths are identified.

61. The method of claim 60, further comprising the step of selecting a transmission path among the multiple transmission paths prior to transmitting.

62. The method of claim 16, further comprising the step of generating a beacon signal from at least one of said seismic acquisition units.

63. The method of claim 16, further comprising the step of determining the number of other seismic acquisition units within transmission range of a seismic acquisition unit.

64. The method of claim 16, further comprising the step of determining the signal strength for other seismic acquisition units within transmission range of seismic acquisition unit.

65. The method of claim 29, further comprising the step of generating a beacon signal and transmitting the beacon signal along the transmission path.

66. The method of claim 65, further comprising the step of verifying the transmission path by generating a beacon signal.

67. The method of claim 65, further comprising the step of utilizing said beacon signal to establish a synchronized recording time among the seismic acquisition units.

68. The method of claim 65, further comprising the step of simultaneously initiating recording of seismic data by said seismic acquisition units.

69. The method of claim 65, wherein seismic data transmitted from a seismic acquisition unit is time stamped.

70. A seismic data tranmission system comprsing:

A. at least two wireless seismic acquistion units, each unit comprising

(1) a casing;

(2) a battery;

(3) a short-range radio transmitter disposed within said casing;

(4) a short-range radio receiver disposed within said casing;

(5) a local clock disposed within said casing;

(6) limited local memory disposed within said casing; and

(7) a processor disposed within said casing; and

B. a receiving unit comprising

(1) a battery; and

(2) a short-range radio receiver.

71. The system of claim 70, wherein said receiving unit further comprises mass memory media.

72. The system of claim 70, wherein said receiving unit further comprises a long-range radio transmitter.

73. A seismic data tranmission system comprsing:

A. at least two wireless seismic acquistion units, each unit comprising

(1) a casing;

(2) a battery;

(3) a wireless fidelity transmitter disposed within said casing;

(4) a wireless fidelity receiver disposed within said casing;

(5) a local clock disposed within said casing;

(6) limited local memory disposed within said casing; and

(7) a processor disposed within said casing; and

B. a receiving unit comprising

(1) a battery; and

(2) a wireless fidelity receiver.

74. The transmission system of claim 70 wherein each seismic acquistion unit further comprises an antenna.

75. The transmission system of claim 70, wherein said antenna is molded into the casing.

76. The transmission system of claim 70 wherein each seismic acquistion unit further comprises a long range radio receiver.

77. The transmission system of claim 70 wherein each seismic acquistion unit further comprises a geophone.

78. The transmission system of claim 70 wherein at least one seismic acquistion unit further comprises a spike externally attached to said case, wherein said spike is in selective electrical contact with said battery.

79. The transmission system of claim 70 wherein at least one seismic acquistion unit further comprises at least three spikes externally attached to said case, wherein at least one spike is in selective electrical contact with said battery.

80. A method for data transmission in a seismic acquisition network, said method comprising the steps of:

A. Providing an array of at least two seismic acquisition units, wherein a first seismic acquisition unit is capable of receiving a short range radio transmission and transmitting a short range radio transmission and a second seismic acquisition unit that is capable of generating data;

B. Utilizing the second seismic acquisition unit to transmit said data via short range radio transmission to the first seismic acquisition unit; and

C. Utilizing the first seismic acquisition unit to receive said data via short range radio transmission from the second seismic acquisition unit.

81. The method of claim 80, wherein said data is seismic data acquired by one of said seismic acquisition units.

82. The method of claim 80, wherein said data is quality control data.

83. A method of charging the batteries of a seismic acquisition unit, said method comprising the steps of:

A. Providing a seismic acquisition unit having a battery and three external spikes;

B. Electrically coupling two of the spikes to the battery through a relay;

C. Electrically coupling the third spike to the relay to control the relay;

D. Utilizing the third spike to close the relay to initiate charging of the battery; and

E. Utilizing the third spike to open the relay upon completion of charging to prevent battery discharge through the spikes coupled to the battery.

84. A seismic acquisition unit, comprising:

A. A case;

B. At least one geophone;

C. A clock;

D. A battery;

E. A first and a second spike each externally attached to said case and each electrically coupled to said battery;

F. At least one relay disposed in the electrical coupling between at least one of said first and second spikes and said battery; and

G. A third spike externally attached to said case and electrically coupled to said relay to open and close said relay.

85. The seismic acquisition unit of claim 84, wherein said relay comprises a first input and a first output, wherein said input is electrically coupled to one of said first and second spikes and said output is electrically coupled to said battery, said relay further comprising a second input electrically coupled to said third spike.

86. The method of claim 16, wherein each acquisition unit has a set of antenna parameters associated therewith and an adjustable transmission range, the method further comprising the step of adjusting the transmission range by adjusting the transmission parameters.

87. The method of claim 16, wherein each acquisition unit has a set of antenna parameters associated therewith and an adjustable transmission direction, the method further comprising the step of adjusting the transmission direction by adjusting the transmission parameters.